

"EVOLUTION WITHOUT NATURAL
SELECTION"

Evolution without Natural Selection; or, The Segregation of Species without the Aid of the Darwinian Hypothesis. By Charles Dixon. (London: R. H. Porter, 1885.)

THE title of this little book is misleading. Far from offering any account of evolution without natural selection, the author habitually ascribes to natural selection the lion's share of the work, only reserving a few odds and ends of small detail as results ascribed by him to other agencies. Such odds and ends have reference almost exclusively to minute differences of coloration in allied species of birds—the argument being that these differences are too minute to count for anything in the struggle for existence, and therefore cannot have been due to survival of the fittest. Now, although Mr. Dixon has presented in a brief and very readable form a considerable number of most interesting facts upon this head, they cannot be said to have any bearing upon the Darwinian hypothesis. For even if it were conceded, for the sake of argument, that all the cases given of slight variation in allied species are without utilitarian significance (although this would be a large concession), we should still be well within the four corners of Darwinism. It is the very essence of the Darwinian hypothesis that it only seeks to explain the apparently purposive variations, or variations of an adaptive kind; and, therefore, if any variations are taken to be non-adaptive, *ex hypothesi* they cannot have been due to natural selection. But as such variations are, even upon the showing of our author himself, for the most part rare and always trivial, they may be freely presented to the anti-Darwinians without any loss to Darwinism. Indeed, Mr. Darwin himself has clearly recognised the occurrence of such trivial specific characters, and observes that if they are "really of no considerable importance in the struggle for life, they could not be modified or formed through natural selection." But it is no part of the theory of natural selection that it should necessarily occupy the whole field of possible causation in the genesis of species. It is surely enough if it be taken to explain all cases of *adaptation*; and this, if we understand him aright, Mr. Dixon is prepared to allow. Thus, for example, he says:—"We can therefore understand how the modifications which many species have undergone, through climatic and other causes, have been taken advantage of *when they began to be of service*; although at the time the modifications took place they were not of the slightest use!" The note of admiration here seems to imply, in accordance with the whole tone of his book, that the writer considers this view to be in some way an important emendation of Darwinism. But, in point of fact, it is Darwinism pure and simple. For Darwin is most express in affirming that natural selection cannot be supposed the original cause of variation, being only called into play when the variations, as Mr. Dixon says, begin to be of service. What these original causes of variation may be is a distinct question, and one which it remains for the future to answer. For, as we shall immediately proceed to show, Mr. Dixon has not been successful in furthering the solution.

The influence on which he chiefly relies is that of isolation, and he has gathered a number of interesting facts whereby to justify his opinion. It is needless to say that this opinion also is quite in harmony with Darwinian teaching; for when a section of a species is geographically isolated, the constituent members of it are virtually confined to a world of their own whereon to begin a new course of history, and being thus cut off from interbreeding with the main stock, there is nothing remarkable in the fact that, under such circumstances and in some cases, the history of the isolated section should not run perfectly parallel with that of the main stock. This, indeed, is Mr. Dixon's own view, and we should have no criticism to offer upon it, if, on the one hand, he did not present it as anti-Darwinian, and if on the other hand he had been more clear in distinguishing between a condition and a cause. He everywhere speaks of isolation as the cause of minute specific characters; whereas it is obvious that at best it can only be the condition to the operation of causes, the nature of which it apparently does not occur to him to suggest.

Another agency invoked by the writer as a direct cause of variation is climate. But here again his views cannot be said to be anti-Darwinian, save in so far as they appear to err on the side of exaggeration. For even Mr. Spencer—who, by the way, ought to have been mentioned by Mr. Dixon as having long ago argued in favour of such direct causes of variation—would scarcely go so far as to attribute to climatic influences variations of a protective kind. This, however, is done by Mr. Dixon; but he maintains a judicious silence upon the closely-allied topic of mimicry. Yet such remarks as the following apply with even more force to the facts of mimicry than to those of protection:—"If the colour was donned from protective motives, to escape some special enemy, it seems impossible not to believe that the species would have become exterminated long before the protective colour reached a beneficial degree of development." Does Mr. Dixon believe that the exquisite details of form and colour whereby an insect is made to resemble a leaf can reasonably be ascribed to climatic influences? If not, what becomes of his argument touching the much less remarkable cases of protective colouring?

There still remains one other criticism of a general kind which it seems impossible to avoid making. On p. 7 it is said: "Natural Selection is probably the most potent agent in the evolution of new species only at such times when the earth is undergoing violent changes. . . . We can conceive how, as soon as violent changes once more pervade the world, the struggle for life will be infinitely greater than it is now. Then species will be matched against species, race against parent form, or race against race; all Nature will be thrown into a kind of chaos; and then Natural Selection will adjust the disordered balance," &c., &c.

Now, this passage, which appears to be intended as conciliatory to Darwinism, is the only really anti-Darwinian passage in the essay. For not only are the views expressed by it in direct contradiction to the now universally-accepted teaching of uniformitarianism, but they equally run counter to the emphatic contention of Darwin, that the great merit of his theory consists in its agreement with that teaching. Not in chaos or in

cataclysm is the influence of natural selection to be sought, but in forest and in field, in river, lake, and sea, where all may seem most orderly and eloquent of peace.

But although we are thus unable to commend Mr. Dixon's philosophical views on topics connected with natural history, we should be sorry to take leave of his work without explicitly stating what has already been implied—namely, that his facts are better than his theories. On this account we consider that his essay well repays perusal, and therefore recommend it to the notice of zoologists.

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FORESTRY IN POLAND

Forests and Forestry in Poland, Lithuania, the Ukraine, and the Baltic Provinces of Russia. With Notices of the Export of Timber from Memel, Dantzic, and Riga. Compiled by John Croumbie Brown, LL.D., &c. (Edinburgh; Oliver and Boyd. London: Simpkin, Marshall, and Co., and William Rider and Son, 1885.)

THIS is another contribution of Dr. Brown's to the subject of forestry and to the furtherance of the formation of the Museum and School of Forestry in Edinburgh, which, it was thought, might be the outcome of the Forestry Exhibition held in the Scotch capital last year. The consideration of the establishment of a forest school has since occupied a wider range of thought, consequent upon the action of Sir John Lubbock in the House of Commons, and in connection with this Dr. Brown's latest volume will probably be of some interest in showing what is effected in forest matters in countries somewhat beyond the track of the ordinary English traveller, notwithstanding that Dr. Brown has given us similar books to the present on the forests of Norway, Northern Russia, the Ural Mountains, &c.

The present book commences with a very readable comparison of the facilities of travelling in Poland, Lithuania, Courland, Estonia, and Livonia some forty years since and at the present time.

In the first chapter the character of the country along the railway for some 200 miles from St. Petersburg towards Poland is described as a dead level of marshes and bogs; such dry land as there is being to some extent covered with trees probably of no great age, "apparently," Dr. Brown says, "the scraggy representatives of extensive forests of a former day." Nowhere are such forests as may be seen in travelling in the Governments of Olonetz and Archangel in Northern Russia, and of Moscow, Orel, and others in Central Russia.

Entering Poland at Kovna, about 200 miles from Dunsburg, and advancing through the eastern portion of that country, Dr. Brown says the traveller remarks that agriculture appears to be carried on with a more scientific character than in the lands through which he has been passing. Agriculture seems also to be more remunerative; the crops are thicker. The fields are sown with wheat, whereas to the north of Kovna barley, oats, and flax alone are cultivated. All the more valuable cereals seem to flourish in Poland, and in passing through this district there is produced an impression that the soil is more

productive than it is further to the north; that the climate must be more equable; and the superficial aspect of the land being more undulating, and at the same time more thickly wooded; that as an agricultural district it must be at least 50 per cent. superior to the Governments of St. Petersburg and of Pskoff. In Poland both wheat and wool are raised for exportation. Large crops of potatoes are grown for the production of spirits by distillation, and beetroot for the manufacture of sugar; and wood for building purposes is exported largely. The Scotch fir (*Pinus sylvestris*) and the oak (*Quercus Robur*) are of very superior quality.

The trees in this district are described as being different in character from those of the region traversed in coming hither. In the earlier stages of the journey they consisted almost exclusively of firs, birches, and willows, while around Berdicheff in Poland the woods are composed in a great measure of oaks, elms, and chestnuts.

Dr. Brown's second chapter is devoted to forest exploitation, and the third chapter to the important subjects of area, distribution, management, and produce of forests. The information under these heads is, however, to some extent technical and statistical. Some interesting facts are quoted regarding what may be called by-products of the forest, such, for instance, as honey, which is collected by the bees largely from the flowers of the lime-tree, as well as from the thyme, hyssop, and buckwheat.

Regarding the schools of forestry in Poland, the most important arrangements for the study of forest science and economy by forest officials are at Novoi Alexandria. Of these arrangements details are given, from which it seems that the institute is ranked as a college of the first class with two sections—one devoted to the study of rural economy and agriculture, the other to the study of forest science and forestry, with a farm, forest, and an extensive domain attached to it, the whole being placed under the Minister of Public Instruction at Warsaw. The staff of officials includes a director, inspector, five professors, eight tutors and three teachers, a laboratory superintendent, a mechanic, foreman of the workshop, land steward or manager of the estate, gardener and assistant, surgeon, secretary, book-keeper, and a superintendent of buildings. No professor can hold two chairs, and any of them after twenty-five years may be again and again reappointed for successive terms of five years each. A Board of Management, consisting of the director, inspector, and two professors, has the charge of expenditure to the amount of 300 roubles, to be sanctioned by the director; the expenditure of sums between 1000 and 5000 roubles requires the sanction of the Council; and the expenditure of sums above this amount that of the Ministry. The course of instruction embraces a very wide range of subjects. The instruction is given in the Russian language. Each professor and tutor is required to give six lectures a week, and teachers to spend twelve hours a week in class duties.

In the second part of Dr. Brown's book, which is devoted to Lithuania, the chapters are apportioned to considerations of the people, the aspects of the country, forests of the Dnieper, while Parts III., IV., and V. are respectively given up to the Ukraine, the timber exports of the Baltic, and the Baltic provinces of Russia.